

CHAPTER

1.2

# Products



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K	✓				
1	✓				
2					
3		✓			
4		✓		✓	
5			✓	✓	
6			✓	✓	
7				✓	✓
8				✓	✓
Math					
Science		✓	✓		✓
Language Arts	✓		✓	✓	✓
Social Studies	✓	✓	✓	✓	
Art				✓	✓
Health					
Communication		✓	✓	✓	✓
Reading					✓
Research				✓	✓
Computation					
Observation/Classification	✓		✓	✓	
Problem Solving		✓	✓	✓	
Motor Skills	✓				✓

\*See Glossary of Skills for more details.

# Products

## How Are Products Made?

Everyone uses a variety of **products** each day—from toothbrushes to notebooks to lunch boxes to video games. Each of these products has an effect on the environment in one way or another. Sometimes merely using (or misusing) a product can affect the health of people and the environment. Some products can affect the environment through the way they are made or disposed of. For example, products made from virgin **natural resources** have different effects on the environment than those made from **recovered resources**. By understanding a product's **life cycle**—the development, use, and disposal of a product—people can make better decisions about what products to buy and how to use them wisely.

A product's life cycle generally includes design; exploration, extraction, and processing of resources (raw materials); manufacturing; distribution and use; and retirement. If a product is made from 100 percent recovered materials, exploration and extraction of virgin materials is not necessary. If a product is recycled, composted, or reused, people do not have to throw it away. By altering the product life cycle in these ways, people can save energy and resources, and therefore, prevent waste and pollution.

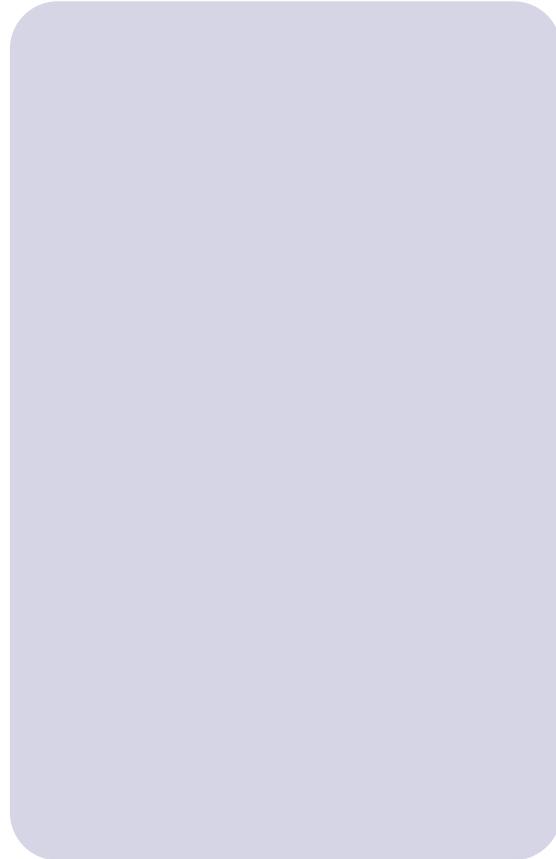
## The Product Life Cycle

The following sections describe each stage in the product life cycle, as well as the challenges, benefits, and emerging trends associated with each step.

### Design

Product design can involve research, testing, and development. This includes development of synthetic materials, such as plastics, which derive from natural sources.

Some products are designed to be used only once (**disposable**), while others are designed to be used many times (**durable**). Engineering and material choices can determine whether a



product is durable, disposable, or **recyclable**, or a combination.

Over the last few decades, as people's lives have become more complicated and technology more advanced, many consumers have come to desire the convenience of disposable items over the durability of reusable ones. Also, it is sometimes easier to replace items rather than fix them. Thus, more and more items end up as trash in **landfills** or **incinerators**.

Products are often conceived and designed with a focus simply on how they will be used and with less concern about the other stages in their life cycle. In the past decade, however, consumers have begun to demand more **environmentally preferable products** or "green" products—products that have fewer negative

effects on human health and the environment when compared to traditional products. Manufacturers have responded by offering products that are made from recycled-content materials, low in toxicity, and high in energy-efficiency. Other products have been designed to conserve water, minimize air pollution or, through a combination of factors, have fewer negative impacts on the environment.

### Exploration, Extraction, and Processing

Manufacturers must obtain the materials needed to make their products. If a manufacturer uses **recovered materials**, the company can obtain them from recycling processors or other similar sources. **Virgin resources**, however, must be mined (for metals and minerals) or harvested (for wood and other biobased materials) from the Earth. Once they are extracted, they must be processed for use in manufacturing.

The extraction of raw materials generates waste and pollution and requires a great deal of energy. In many cases, the natural resources used in manufacturing are **nonrenewable**. This means that, eventually, the natural resource will be depleted. As more

and more communities offer recycling programs and people participate in them, manufacturers may be able to use increased recovered materials instead of virgin materials to make products.

### Manufacturing

Whether a product is made from virgin or recovered materials, often the factories that manufacture the product are specially designed to use a consistent form of material. If a product is made in a plant designed to process virgin materials, changing to recycled materials might not be easy. Changing the kinds of materials used in manufacturing, such as using recycled paper instead of virgin paper, can require changes in technology and equipment and can slow down the pace of production. In the past decade, however, many manufacturing plants have begun retooling and learning to use recovered materials rather than virgin materials, and thus, the variety of recycled-content products has been growing. (See the Teacher Fact Sheet titled *Recycling* on page 101 for more information.)

Manufacturing products generates pollution and usually requires a great deal of energy. Using recovered materials can often save energy and reduce pollution. The manufacturing process also generates waste, but at some manufacturing plants, this waste can be reused.

### Distribution and Use

People rely on various products to live in a modern society. Most people purchase and use some type of manufactured product every day because it is easier and more convenient than making the same items from scratch (for example, going to a store and buying a box or bag of rice is much simpler, and more practical, than trying to grow rice in a paddy in the backyard).

After products are manufactured, many must be packaged for transportation and distribution. Often, products are transported long distances across the nation or even internationally before people can purchase and use those items.



### Product Facts

- Most glass bottles and jars contain at least 25 to 30 percent recycled glass.
- Making 2,000 pounds of paper from trees requires 3,700 pounds of wood, 200 pounds of lime, 360 pounds of salt cake, 76 pounds of soda ash, 24,000 gallons of water, and 28 million BTUs of energy.
- Making an aluminum can from recycled material requires 95 percent less energy than making one from the natural resource raw material, bauxite ore.
- For every 100 pounds of products made, over 3,000 pounds of waste is generated.

(Sources: Glass Packing Institute; Can Manufacturers Institute; Weyerhaeuser Company.)

Products often require packaging to protect them from spoilage, damage, contamination, and tampering during transportation, storage, and sale. Sometimes packaging is necessary to inform consumers about product benefits, proper use, and other information. While some products might appear to have excessive packaging, in many cases the packaging serves several purposes, without which the products might not be available as widely or as frequently.

Packaging—when it is discarded—can create a great deal of waste. In communities where common packaging materials are not recyclable, these items must be thrown away, wasting precious resources and potential recovered materials.

### **Product Retirement**

After use, many items or packaging are disposed of in landfills or incinerators. Others are recovered for recycling. If products are disposed of in landfills or incinerators, they can no longer provide any benefit. Emissions to air and water from these disposal methods can affect human health and the environment.

## **Think Globally, Buy Locally**

One way consumers can help eliminate the need for excessive packaging is to buy products locally. This concept, known as bioregionalism, works on the idea that if consumers buy products made within their own communities, packaging that would otherwise be needed to protect the products during transportation and storage could be eliminated or reduced.

If products are recycled, composted, or reused, they continue to serve a purpose, either as a raw material or for the same use they were originally intended. Extending a product's life is a way to save natural resources, prevent waste, reduce pollution, and conserve energy.

The more people recycle and buy recycled products, the more incentive manufacturers will have to make products with recovered content.

### **Additional Information Resources:**

Visit the following Web sites for more information on designing and purchasing products with the environment in mind:

- U.S. Environmental Protection Agency (EPA): <[www.epa.gov](http://www.epa.gov)>
- U.S. EPA Office of Solid Waste product stewardship site: <[www.epa.gov/epaoswer/non-hw/reduce/epr/index.htm](http://www.epa.gov/epaoswer/non-hw/reduce/epr/index.htm)>
- U.S. EPA Office of Pollution Prevention and Toxics, Design for the Environment Program: <[www.epa.gov/dfe](http://www.epa.gov/dfe)>
- U.S. EPA Office of Pollution Prevention and Toxics, Environmentally Preferable Purchasing: <[www.epa.gov/opptintr/epp](http://www.epa.gov/opptintr/epp)>

To order the following additional documents on municipal solid waste and product life cycle, call EPA toll-free at (800) 490-9198 or look on the EPA Web site <[www.epa.gov/epaoswer/osw/publicat.htm](http://www.epa.gov/epaoswer/osw/publicat.htm)>.

- *WasteWise Update—Extended Product Responsibility* (EPA530-N-98-007)
- *Puzzled About Recycling's Value? Look Beyond the Bin* (EPA530-K-97-008)
- *A Collection of Solid Waste Resources* on CD-ROM

# A Matching Match



## Objective

To teach students that many products come from natural resources such as animals and plants.



## Activity Description

Students will draw a line from a product to its natural source and then color the pictures.



## Materials Needed

- Copies of the *Matching Match* worksheet for each student
- Crayons



## Subjects Covered

Natural resources  
Products



## Duration

1 hour



## Skills Used

Observation/classification  
Motor skills



## Activity

**Step 1:** Discuss with students that everything we use is made from a natural resource, such as a plant or other resource that comes from the Earth. Some products also come from animals. Provide examples by talking about what students are wearing or items in the classroom and the sources of those items.

**Step 2:** Either individually or in groups, have the students use the *Matching Match* worksheets to match the different products with their natural resource.

**Step 3:** Encourage the students to color the pictures.



## Assessment

1. Ask the students to name other items that are made from the same natural resources that are listed on the worksheet.
2. Ask students to list other plants and animals that products are made from.



## Enrichment

1. Pick a product that is made in your local community, such as paper, ice cream, or wool sweaters, and take the students on a field trip to see how it is made. Ideally, students would see how a raw material is converted into a product.



social  
science



art

# Student Handout

## Matching Match

Name: \_\_\_\_\_



newspaper



milk



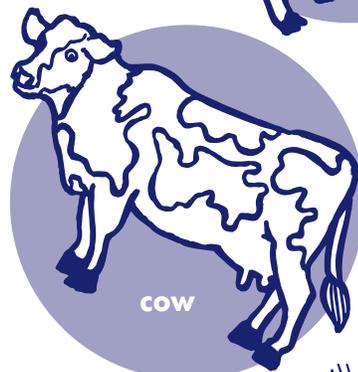
cotton t-shirt



wool hat



sheep



wheat



# Tracing Trash Back to Its Roots



science



social studies



## Objective

To teach students to identify the various natural resources used to produce common items that become waste.



## Key Vocabulary Words

Natural resources  
Renewable resources  
Nonrenewable resources



## Activity Description

Students will play “Trash Bingo” as a method to identify what natural resources are used to make common products.



## Duration

1 hour



## Materials Needed

- Copies of bingo card for each student (make copies and then cut sheets so half the students get one version of the bingo card and half get a different version).



## Skills Used

Communication  
Problem solving



## Activity

**Step 1:** Review and explain the vocabulary words above. Explain that most products are made from natural resources. (Refer to the Teacher Fact Sheets titled *Natural Resources* on page 5 and *Products* on page 25 for background information.)

**Step 2:** List five categories of natural resources on the blackboard: animals, fossil fuels, metals, plants/trees, and sand. Discuss with students some examples of products that are made from these natural resources. Brainstorm a list of things that are made from natural resources (mostly everything!) and make another list on the blackboard. Make sure there are at least five products for each natural resource category. Encourage students to think of food and beverage items and con-

## Common Products

Aluminum can	Grocery bag
Aluminum lawn chair	Hamburger
Apple core	Leather jacket
Bicycle tire	Linen pants
Bologna sandwich	Milk container
Book	Mirror
Bread	Nylon pantyhose
Cereal box	Sandwich bag
Cotton shirt	Soda bottle
Egg shells	Window
Glass bottle of juice	Wool hat



## Journal Activity

Ask students to write about what natural resources mean to them. Ask them to pick a natural resource and describe why it is special or important to them.

Or

Have students write about their favorite toy or game. Have them write a history of where it came from, starting from when it was a natural resource.

tainers, household product containers, and household items (furniture, books, appliances). See suggestions in box if the list is deficient.

**Step 3:** Explain the rules for bingo, and hand out bingo cards.

**Step 4:** Select words from the students' product list (or the list of suggestions) and call out words one at a time. Instruct students to find the category or categories that each item belongs in on their bingo sheet and write the name of the product. There may be more than one natural resource for each product (for example, a pair of tennis shoes might fill three categories: plant, fossil fuel, and metal).

**Step 5:** The first student to fill the card wins. Use the T-R-A-S-H letters as free spaces. Be sure to check the student's bingo sheet to see if all answers are correct!

**Step 6:** After the bingo game, have each student circle the items that are made from renewable resources.



## Assessment

1. What are natural resources?
2. What's the difference between renewable and nonrenewable natural resources?



## Enrichment

1. Additional questions include asking students what happens if we keep using more and more natural resources? How can we stop using so many natural resources? How can we use more renewable resources and less nonrenewable resources?
2. Play show and tell. Have students bring in one of their favorite "things" and tell the class where it came from, including the resources used in producing it and how it came to be in their house. Have them describe what they will do with it when it is broken, old, used up, or no longer needed.
3. Conduct a scavenger hunt. Make a list of common items found inside or outside of the classroom that are derived from animals, plants, metals/minerals, fossil fuels, or sand. Have students find 15 of 30 items and identify which category they belong in. Give the students 15 minutes to look for the items, then call them together and discuss their answers.

Name: \_\_\_\_\_

## Trash Bingo



Animals	Fossil Fuels	Metals	<b>S</b>	Sand
Plants/Trees	Metals	Metals	Sand	Fossil Fuels
Fossil Fuels	<b>R</b>	<b>A</b>	Plants/Trees	Sand
<b>T</b>	Animals	Sand	Plants/Trees	<b>H</b>
Plants/Trees	Fossil Fuels	Fossil Fuels	Metals	Metals



## Trash Bingo

<b>T</b>	Animals	Metals	Fossil Fuels	Fossil Fuels
Sand	Plants/Trees	<b>A</b>	Metals	Sand
Animals	Metals	Metals	Fossil Fuels	Plants/Trees
Plants/Trees	Sand	Sand	<b>S</b>	Plants/Trees
Fossil Fuels	<b>R</b>	Plants/Trees	Fossil Fuels	<b>H</b>



Name: \_\_\_\_\_

# Putting Products Under the Microscope



## Objective

To have students evaluate a product to determine its resource use and overall impacts on the environment.



## Activity Description

Students select a product manufactured in their community and discuss the raw materials and resources required to make the product.



## Materials Needed

- Copies of *Product Inspector* worksheet for students.



## Key Vocabulary Words

Products  
Manufacturing process  
Raw materials  
Resources  
Ecosystems



## Duration

30 minutes



## Skills Used

Communication  
Observation/classification  
Problem solving



## Activity

**Step 1:** Explain that everyone uses a variety of products every day. Note that there is a manufacturing process involved in creating a new product and that any new product requires raw materials. (Refer to the Teacher Fact Sheets titled *Natural Resources* on page 5 and *Products* on page 25 for background information.)

**Step 2:** Have students select a product that is made in their community or state. Products might include bicycles, batteries, pens, milk, shoes, ships, plastic toys, glass bottles, or paper.

**Step 3:** Ask the students to draw a picture of the product. Then ask them to label all of the product's different parts and write both the

raw materials used to make each part as well as the original resources used to make the raw material on the *Product Inspector* worksheet. If a student draws a car, for example, he or she would label the dashboard and note that plastic is derived from petroleum.

**Step 4:** Discuss whether there are more raw materials required to make the product than expected. Ask where the raw materials come from—your town, state, country, or another nation. Discuss what happens to the environment when the raw materials are extracted from the Earth or harvested. Does this process produce pollutants or harm land or ecosystems? Discuss ecosystems in your geographical area that might be affected by the removal of raw materials. How might people living in the area be affected?



science



language  
arts



social  
studies



## Journal Activity

Ask the students to name some products they could give up for a day, a month, or longer. Ask them to describe how giving up these items would affect other people and the environment.

**Step 5:** Ask students to describe what happens to the product after they use it. Can it be used up or will it wear out? Can the product or its parts be reused or recycled in some way? How? Will the product or its parts decompose if buried in a landfill? What effects does disposing of this product have on the environment? Who pays for disposing of the product? Who is responsible for disposing of it?



## Assessment

1. Ask students how products are created.
2. Ask students how this process impacts the environment.
3. Have students explain what happens to products after we are finished with them.
4. Ask students if they think we really need all of the products we use. Why or why not?



## Enrichment

1. Contact or visit the manufacturer with your class to learn more about the process and materials used to make the product.
2. Ask students to name the different products they use during the course of a day (e.g., toothbrush, shoes). Make a list of these items on the blackboard. Then, ask students to categorize the product as essential to survival, necessary for living in today's society, or a luxury. Ask students if they are surprised how few products we really need and how many products are a luxury. Explain to students that all products create waste and that they should keep this in mind when they buy products.
3. Check books, articles, and magazines, or write to agencies or organizations to learn about the types of natural resources (e.g., wood, oil) that the United States obtains from other countries. Research whether these are renewable or nonrenewable resources. Describe what might happen if we begin to use up these resources. What can we do to conserve these resources?



# Let's Go Eco-Shopping!



## Objective

To teach students how to identify and evaluate the environmental attributes of products and assess their environmental impacts.



## Activity Description

Research products that students buy and discuss their environmental attributes.



## Materials Needed

- Five products with environmental claims on labels (e.g., a cereal box made with recycled content, an aluminum can with a recyclable symbol, a cleaning product marked “biodegradable”).
- Product Review Worksheet (one for each student).
- EPA’s Let’s Go Green Shopping brochure located at [www.epa.gov/epaoswer/education/pdfs/shopping.pdf](http://www.epa.gov/epaoswer/education/pdfs/shopping.pdf). To order copies of this brochure, please visit [www.epa.gov/epaoswer/osw/pub-l.htm](http://www.epa.gov/epaoswer/osw/pub-l.htm) or call EPA at (800) 490-9198 and reference document number EPA530-K-04-003.
- EPA and the Federal Trade Commission’s Environmental Marketing Claims brochure at [www.epa.gov/epp/documents/claims.htm](http://www.epa.gov/epp/documents/claims.htm).



## Key Vocabulary Words

Postconsumer-recovered material content  
Life cycle  
Environmental attribute



## Duration

2 hours over two classroom periods



## Skills Used

Communication  
Research  
Observation/classification  
Problem solving



## Activity

**Step 1:** Bring in at least five products with environmental claims (e.g., aluminum cans, newspapers, paper towels) and examine them with the class. List the attributes on the chalkboard and discuss them (refer to the Teacher Fact Sheet titled *Buying Recycled* on page 107). For example, many paper products are manufactured with environmental attributes such as those listed in the “Environmental

## Environmental Attributes for Paper

Preconsumer content  
Postconsumer content  
Recyclability of packaging  
Recyclability of product  
Reusability of item

Attributes for Paper” sidebar. Use the EPA/FTC *Environmental Marketing Claims* brochure to teach students what different labels mean



language arts



social studies



art



## Journal Activity

Have students keep a *journal* of everything they buy in a week or on one trip to the mall (including food). Ask them to examine the purchases and think of ways to reduce waste on future shopping trips (e.g., take a reusable bag for carrying purchases, buy in bulk to reduce packaging waste).

(e.g., all natural, recycled-content percentages, biodegradable). Discuss product manufacturing (refer to the Teacher Fact Sheet titled *Products* on page 25 and its potential impact on the environment. Discuss how changing some of the practices involved in product manufacturing can increase or diminish a product's environmental impact over its life cycle (refer to *A Product's Life* on page 43).

**Step 2:** Divide into groups or have each student choose one product (from home or school) that could possess environmental attributes (e.g., binders with recycled-content plastic covers, paper clips with recovered plastic, energy-efficient computer). Have the students research his or her product (e.g., read product literature/labels, contact the company, Web research, visit a store that sells the product). Give students copies of the *Product Review Worksheet* and instruct them to answer the questions while researching.

**Step 3:** After students conduct and compile their research, have a class discussion where students report their results (discuss more than one product at a time if several students chose similar items. On the chalkboard, list the environmental attributes each person discovered. Discuss which products are the most environmentally sound and why. Point out that attributes can vary depending on local, personal, and other circumstances. For instance, if the students live in a desert community, products that conserve water might be most important to them.



## Assessment

1. Ask students to think about their shopping habits. Before today's lesson, ask them if they consider environmental attributes when purchasing products. After the lesson, ask them if they will in the future. Discuss what kinds of attributes they will pay the most attention to and why.
2. Ask students to suggest environmental attributes to consider when purchasing some products other than those already researched (e.g., beverages, paint, food items).



## Enrichment

1. Have students conduct a "mall scavenger hunt" to search for "green" products and/or the sustainable practices of stores or the mall (e.g., recycling bins). While on the scavenger hunt, students can take note of:
  - Stores that sell products with environmental attributes (e.g., bags with recycled content, biodegradable beauty products).
  - Recycling containers available for mall customers.
  - Store and/or mall managers who are knowledgeable about recycling, waste reduction, and green products.
2. Instruct students to select one of the products examined in this activity and create a detailed lifecycle flow chart of the steps involved in manufacturing, use, or disposal of the item (refer to the Teacher Fact Sheet titled *Products* on page 25 and *A Product's Life* on page 43).
3. Have students write and design a marketing brochure or public service announcement (refer to the *Memorable Media Messages* activity on page 215) that emphasizes a product's environmental attributes. Instruct students to develop the brochure targeting consumers. The brochures should explain why a consumer might purchase this item over a competing company's product. Students should pay special attention to the

guidelines outlined by EPA and the FTC in the *Environmental Marketing Claims* brochure.

4. Students can hold an open house to showcase the items they purchased. They can create a display of the “green” products and set it up either in the classroom or elsewhere in the school. Suggest placing an index card or small piece of posterboard next to each product explaining the environmental attributes it contains.
5. Students can hold an “eco” fashion show for their classmates or the whole school. They can create outfits by supplementing the items they found while shopping with used clothing from thrift shops. Suggest that they present the clothing and accessories in a live fashion show format or museum-type display (e.g., using mannequins, hangers).
6. Have students conduct research and write a report about a “green” company or a specific “green” product.
7. Have students write letters to companies. They can either write to ask a company why they do not sell/design green products, or they can thank a company for selling sustainable products.



Part of an eco-fashion show of reused clothing from thrift shops at a Pennsylvania middle school.

8. All toilet paper contains a percentage of recycled paper, but only some companies advertise this fact. Have students compare packaging for five different toilet paper brands to determine how many advertise that the paper is made from recycled content and how many do not. Write a letter to the companies that do not advertise the recycled content of their toilet paper, asking them why they choose not to promote this fact.

Name: \_\_\_\_\_

## Product Review Worksheet

**1.** List the environmental attributes of your product.

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**2.** Are there any brands of your product that advertise environmental attribute claims? If so, how many different brands are available?

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**3.** Which brand offers more environmental attributes?

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**4.** What are the costs of the different brands? If the price differences are substantial, why do you think that is?

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**5.** What attributes do you think are the most important and which products have those attributes?

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**6.** Why did you choose to purchase your product?

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**7.** Whether your product is an electronic or not, list some actions you can take to recycle electronics.

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# A Product's Life



## Objective

To teach students the concept of product life cycles, including the various steps and related environmental issues involved.



## Activity Description

Using the *Life Cycle of a CD or DVD* and/or *Life Cycle of a Cell Phone* or other life cycle posters as an example of a product life cycle, students research the steps involved in a product's life cycle and present their findings to the class.



## Materials Needed

- The *Life Cycle of a CD or DVD* poster and/or *The Life Cycle of a Cell Phone* poster located at <[www.epa.gov/epaoswer/osw/students/finalposter.pdf](http://www.epa.gov/epaoswer/osw/students/finalposter.pdf)> and <[www.epa.gov/epaoswer/education/pdfs/life-cell.pdf](http://www.epa.gov/epaoswer/education/pdfs/life-cell.pdf)>. To order copies of these materials, please visit <[www.epa.gov/epaoswer/osw/pub-l.htm](http://www.epa.gov/epaoswer/osw/pub-l.htm)> or call EPA at (800) 490-9198 and reference document numbers EPA530-H-03-002 and EPA530-H-04-002.
- Index cards.
- Library, computer/Internet access, EPA's *Let's Go Green Shopping Guide* (available at <[www.epa.gov/epaoswer/education/pdfs/shopping.pdf](http://www.epa.gov/epaoswer/education/pdfs/shopping.pdf)> or order online at <[www.epa.gov/epaoswer/osw/pub-l.htm](http://www.epa.gov/epaoswer/osw/pub-l.htm)>), or other sources of research.
- For enrichment activity:
  - Scissors
  - Markers
  - Heavy-duty (cardstock) paper



## Key Vocabulary Words

"Cradle to Grave"  
Extraction  
Life cycle  
Manufacturing  
Processing  
Remanufactured products  
Recovered materials  
Virgin resources  
(natural resources)



## Duration

Day 1: 1.5 hours  
Day 2: 1 hour



## Skills Used

Research  
Reading  
Communications  
Motor Skills



## Activity

### Day 1

**Step 1:** Introduce the concept of product life cycles. (Refer to the Teacher Fact Sheets, titled *Products* on page 25 and *Natural Resources* on page 5; the *Let's Go Eco-Shopping* activity

on page 39; the information on the *Life Cycle of a CD or DVD* and/or *Life Cycle of a Cell Phone* poster; and EPA's *Let's go Green Shopping Guide*.) Start by giving a general overview of life cycles, and relate this concept to something familiar to the students (e.g., our own lives, the life cycle of a tree). Continue by explaining that all products are made of something that ultimately comes from nature; and



language  
arts



art



science

that all products end up somewhere after we are finished using them.

**Step 2:** Move on to more in-depth discussions of the various steps of a product's life cycle. Be sure to define each step: raw materials acquisition/extraction, materials processing, manufacturing, product packaging, distribution, use (lifespan), and end use (reuse, recycling, disposal). Discuss how each of these steps can have environmental consequences.

**Step 3:** Investigate the life cycle of an everyday item. Have the class select one or two products whose life cycles they would like to research. Choose a common product, such as one used often in class or at home. (For example: calculator, radio, remote control, light bulb, pencil sharpener, computer keyboard or mouse.)

**Step 4:** Divide the class into research teams for each item chosen. As a homework assignment or an in-class activity, have students work in groups of three or four individuals to research an individual step of the chosen product's life cycle. Students can use the library, Internet, and other resources, including those listed on the Teacher Fact Sheets in this binder.

## Day 2

**Step 5:** Direct the students to use their findings to organize a short presentation to the class. Give each group a handful of index cards on which they can write down notes. Have each group give an oral presentation to the entire class on what they discovered through their research. Be sure to only discuss one product's life cycle at a time and have the groups present in the proper order of the steps of a life cycle (i.e., materials extraction, then processing, then manufacturing, etc.). Encourage the students to be creative, including using props or other visual means of presenting their information.



## Assessment

1. Oral presentations can be judged and graded on the following criteria:
  - Comprehension of life cycle concept and comprehension of individual step in the life cycle.
  - Effectiveness of presentation
  - Creativity
  - Completeness
  - Research method and sources
  - Ability to work in a group
2. Ask the students if knowing more about a product's life cycle might affect their decision to buy the product. Discuss the choices we have as consumers. (Refer to the *Let's Go Eco-Shopping* activity on page 39 for more information.)



## Enrichment

1. Compare the lifespan of various products and how this relates to product life cycles. For example, compare the environmental impacts of various types of cameras (disposable vs. traditional film vs. digital) as they relate to product life cycles. Include a discussion of the advantages/disadvantages of each product option.
2. Using the same groups created for the main activity, create a graphic display of the chosen product's life cycle.
  - a. Have each group of students create a graphic display of their step of the life cycle. Encourage the students to be creative but ask that each display indicates movement from one step of the life cycle to the next.
  - b. After each team gives their oral presentation, have the class work together to display the final product in sequential order along the walls of the room, in the hallway, or a similar appropriate space. (The end result may look similar to *The Life Cycle of a CD or DVD* poster when completed.)